# MALOCCLUSION STATUS AND ORTHODONTIC TREATMENT NEEDS OF 14-YEAR-OLD YEMENI ADOLESCENTS

RASHEED ABDULSALAM AL-MAQTARI

THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF CHILDREN'S DENTISTRY AND ORTHODONTIC
FACULTY OF DENTISTRY
UNIVERSITY OF MALAYA
KUALA LUMPUR

2011

## ABSTRACT

The aim of this study was to develop a national database on the prevalence, severity of malocclusion and orthodontic treatment needs among Yemeni adolescents. Other variables included were geographical zones, gender and urban-rural locations.

A multi-stage stratified random sample of 2400 subjects from 60 schools with equal proportion of male and female were selected from nine governorates covering the whole topography of Yemen (coastal, plateau, mountains, desert and islands). Measuring instruments were the conventional FDI/WHO method of occlusal traits (Baume et al., 1973; Berzoukov et al., 1979) and the Index of Orthodontic Treatment Needs (IOTN), (Brooke and Shaw, 1989; Richmond et al., 1995). Other occlusal traits included based on clinical oral examination were canine relationship and bimaxillary protrusion. Data collection was carried out by one examiner assisted by a recorder, using mouth mirror and the orthodontic ruler, with patient seating on a portable dental chair or classroom chair and natural light. Prior to the oral examination, the examiner was calibrated against a gold standard on children of the same age in Malaysia. A pilot study was again conducted on Yemeni children in Thamar a week before data collection began. All information gathered was checked for completeness and data was transferred into a laptop using the SPSS software data entry program. Analysis was carried out using the SPSS version 15 program.

Measurement of occlusal traits based on FDI/WHO objective method showed that dental discrepancies was observed in 14.6% (impacted 5.7%, congenitally absent 2.2%, retained deciduous 3.2%, missing due to extraction or trauma 2.8% and supernumerary 0.7%) of the sample examined. Crowding was observed in 53.3% of the sample, of whom 27.8% had crowding of ≥ 2 mm. Spacing was observed in 2.9% of the sample, mostly in the maxilla. Midline diastema was also found to occur in 5.4% of the sample

examined. Asymmetrical molar relationship was only observed in 11.3% of the sample, mostly of Class I/Class II relationship (9.4%). Overjet was observed in 9.1% of the sample. Only a small proportion (2%) had anterior crossbite, deepbite (10.3%), anterior openbite (4.5%), posterior openbite (2.9%), posterior crossbite (5.2%) and 2.7% scissor bite. Other occlusal traits measured clinically were partially erupted teeth (6.5%), Class II canine relationship (right 17.4%, left 18.4%), Class III canine relationship (right 1.8%, left 1.7%) and bimaxillary protrusion (9.3%).

Normative orthodontic treatment needs as assessed using the Dental Health Component criteria of (IOTN) showed that slightly less than half (44.3%) of the adolescents needed some form of orthodontic treatment (Grades 3,4 and 5). Of this a quarter (26.8%) 'definitely' needed treatment. Assessment of whether examiner or subject perceived orthodontic treatment need was made using the Aesthetic Component of IOTN. Findings showed that examiner perceived at least 28.9% of the adolescents in this study needed orthodontic treatment (18.8% 'borderline' and 10.1% 'definite' need); on the contrary subjects themselves perceived a much lower proportion (13.4%). Further analysis was carried out to compare the findings according to gender, urban-rural areas and country's topography.

In conclusion, findings showed the prevalence of malocclusion was 74.4% when measured using the conventional WHO/FDI criteria. But when measured with Index of IOTN, the prevalence of malocclusion observed was 68.2%. Although both examiner measurements of normative and aesthetic perceived need indicated a relatively high, subjects self-perceived needs was however low. These findings suggest a need for a more conservative treatment approach in dealing with malocclusion problems among Yemeni adolescents.

## DECLARATION

I certify that this thesis is based on my own independent work, except where acknowledged in the text or by reference. No part of this work has been submitted for a degree or diploma to this or any other university.

Dr. Rasheed Abdulsalam Al-Maqtari

Date:

Supervisor: **Associate Professor Dr. Halimah Awang**
Department of Children's Dentistry and Orthodontic,
Faculty of Dentistry,
University of Malaya,
Kuala Lumpur,
Malaysia.

Co-Supervisor: **Professor Dr. Rahimah Abdul Kadir**
Deputy Dean,
Postgraduates, Research, Internationalisation & Industry,
Faculty of Dentistry,
Universiti Kebangsaan Malaysia,
Kuala Lumpur,
Malaysia.

Co-Supervisor: **Dr. Norzakiah Mohamed Zam Zam**
Part-time lecturer,
Department of Children's Dentistry and Orthodontic,
Faculty of Dentistry,
University of Malaya,
Kuala Lumpur,
Malaysia.

## ACKNOWLEDGEMENTS

First of all, I thank "God" for inspiring me with the ability, strength and patience to perform this modest study.

My deepest gratitude and appreciation to my supervisor *Professor Dr. Rahimah Abdul Kadir* for her wisdom, encouragement, guidance, patience and continuous valuable scientific suggestions throughout the preparation of my thesis, as well as for the time she has spent reading the various drafts. Her critical commentary on my work has played a major role in both the content and presentation of my arguments.

I would like to express my sincere gratitude to my supervisor *Associate Professor Dr. Halimah Awang* for her guidance, valuable advice, continuous support, patience and valuable time throughout my work and very helpful comments.

I am most grateful to my supervisor *Dr. Norzakiah Mohamed Zam Zam* for her bright ideas, guidance and for being generous with her knowledge, experience and time in supervising and encouraging me greatly in every step along the way of this work.

My grateful thanks and praise goes to the Dean, *Professor Dr. Rosnah Zain,* and *Professor Dato' Dr. Ishak Abdul Razak* former Dean, Faculty of Dentistry, University of Malaya for their continuous support to all the postgraduate students including myself.

I would like to express my deepest gratitude to *Associate Professor Dr. Noor Hayaty Abu Kasim,* Deputy Dean (Research and Postgraduate), Faculty of Dentistry, University of Malaya for managing all the necessities for postgraduate program.

I wish to express my most sincere appreciation to all staff and members of the Department of Children's Dentistry and Orthodontic for their invaluable supports. Also

grateful thanks to *Dr. Marhazlinda Jamaludin,* Head of Informatic Unit, Faculty of Dentistry, University of Malaya for her statistical help and advice.

I would like to offer my appreciation to *Professor Dr. Ahmad Abdo Saleh* Vice-Rector for Postgraduate Studies and Scientific Research, Thamar University, Yemen for his support, cooperation and communication with Ministry of Health and Ministry of Education throughout my work.

My special thanks to *Dr. Mohamed Al-Tabib*, *Dr. Nasr Al-Qudimi* and *Lutf Al-Yemeni* for their help in organising the survey and data collection. Also my sincere thanks to *Professor Dr. S. Richmond,* for having kindly provided some references related to this study.

I would like to thank University of Malaya, Malaysia and University of Thamar, Yemen for giving me this opportunity to continue my study and also for providing an effective environment and financial supports.

My grateful thanks and appreciation to headmasters, all the school staffs and students involved in this study for their kind help and cooperation. The author would also like to express special thanks to so many others unmentioned but certainly not forgotten.

Finally, my acknowledgement would not be completed without recognising the role of my wife *Lubna* and my beloved children *Emad, Bara'a* and *Khaled* for their love and patience. I should also like to express my deepest gratitude to the memory of my father, my mother and every member in my family for all that they have done for me.

**CONTENTS**

## LIST OF FIGURES

## LIST OF TABLES

## LIST OF ABBREVIATIONS USED IN THE THESIS

| Abbreviation | Meaning |
|---|---|
| ABO | American Board of Orthodontics |
| AC | Aesthetic Component |
| AD | Anno Domini |
| BC | Before Christ |
| CalMod | California modification |
| COCSTOC | Commission on Classification and Statistics for Oral Conditions |
| DAI | Dental Aesthetic Index |
| DHC | Dental Health Component |
| FDI | Fédération Dentaire Internationale |
| HLDI | Handicapping Labio-lingual Deviations Index |
| HMAR | Handicapping Malocclusion Assessment Record |
| ICON | Index of Complexity Outcome and Need |
| IOTN | Index of Orthodontic Treatment Need |
| MERM | Method for Epidemiological Registration of Malocclusion |
| MOCDO | Missing, Overjet, Crossbites, Displacement, Overbite |
| MSE | Malocclusion Severity Estimate |
| NOTI | Need for Orthodontic Treatment Index |
| ºC | Degree Celsius |
| OFI | Occlusal Feature Index |
| PAR | Peer Assessment Rating |
| Per annum | Per year |
| SCAN | Index of Standardised Continuum of Aesthetic Need |
| TDI | Treatment Difficulty Index |
| TPI | Treatment Priority Index |
| WHO | World Health Organisation |

## List of Appendices